<u>WHAT IS CLAIMED IS:</u>

1. 1. A method for evaluating a color picture tube comprising:
2. displaying on a display surface of a color picture tube a measurement pattern
3. including a plurality of first patterns arranged at different positions relative to fluophor dots
4. of said color picture tube and a plurality of second patterns near said first patterns and
5. sufficiently large relative to said fluophor dots;
6. obtaining a first image using an imaging element to image said displayed
7. measurement pattern;
8. obtaining a second image using said imaging element to image while
9. controlling light intake to allow brightness components of no more than about 1% of
10. maximum luminance from said first image to be separated from noise and imaged;
11. creating a third image by combining said first image and said second image
12. while adjusting scales according to a light intake ratio;
13. calculating, from said third image, display center positions of said plurality of
14. first patterns using said second pattern positions;
15. measuring discrete fluophor emission intensity distributions for each of said
16. plurality of first patterns; and
17. obtaining an electron beam intensity distribution by matching display center
18. positions of said plurality of first patterns and combining said plurality of first patterns.

1. 2. The method for evaluating a color picture tube as described in claim 1,
2. wherein in said step for displaying said measurement pattern, there are at least a
3. predetermined number of said first patterns or said line patterns or said dot patterns having
4. phases, defined by a decimal fraction of a display pitch/fluophor pitch, within a
5. predetermined range relative to a first pattern or a line pattern or a dot pattern serving as a
6. reference.

1. 3. The method for evaluating a color picture tube as described in claim 1,
2. wherein in said step for displaying said measurement pattern, at least two of said second
3. patterns are arranged horizontally or vertically, and in said step for obtaining said third
4. image, a slope of a line connecting said at least two second patterns is calculated and
5. rotational transformation is applied to said image so that said slope is 0.

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1   4.   The method for evaluating a color picture tube as described in claim 1,

2 wherein in said step for obtaining said third image, a pitch of said fluophors contained in said

3 second patterns is measured in image element units, and said fluophor pitch is used to

4 calculate an image element size.

1   5.   The method for evaluating a color picture tube as described in claim 1,

2 wherein in said step for obtaining said third image, at least one position of said second

3 patterns is detected from said first image and a corresponding second pattern position is

4 detected from said second image, and an offset between said detected positions is used to

5 detect an offset between said first image and said second image.

1   6.   The method for evaluating a color picture tube as described in claim 1,

2 wherein in said step for displaying said measurement pattern, said measurement pattern is

3 displayed at a plurality of positions on said picture tube display surface, and a position

4 recognition pattern is displayed close to each of said measurement patterns.

1   7.   A method for evaluating a color picture tube, comprising:

2   displaying on a display surface of a color picture tube a measurement pattern

3 formed from a plurality of basic patterns and auxiliary patterns;

4   obtaining a first image by imaging said displayed measurement pattern under a

5 first light intake condition;

6   obtaining a second image by imaging said displayed measurement pattern

7 under a second light intake condition;

8   obtaining a third image by combining said first image and said second image

9 based on said first light intake condition and said second light intake condition;

10   determining a display center position of said basic pattern from said auxiliary

11 pattern position information from said third image;

12   measuring discrete fluophor emission intensity distributions for each of said

13 plurality of basic patterns; and

14   obtaining an electron beam intensity distribution by matching display center

15 positions of said plurality of basic patterns for which discrete fluophor emission intensity

16 distributions were calculated and combining said plurality of basic patterns; and

17   outputting information relating to said determined electron beam intensity

18 distribution.

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1   8.   The method for evaluating a color picture tube as described in claim 7,

2 wherein said second light intake condition is set so that, in said second image imaged under

3 said second light intake conditions, images associated with areas having a brightness of no

4 more than about 1% of a maximum luminance from said first image are distinguishable from

5 noise.

1   9.   The method for evaluating a color picture tube as described in claim 7,

2 wherein, in said step for displaying a measurement pattern, said measurement pattern is

3 displayed at a plurality of positions on said picture tube display surface, and a position

4 recognition pattern is displayed close to each of said measurement patterns.

1   10.   A method for evaluating a color picture tube, comprising:

2   displaying a measurement pattern on a display surface of a color picture tube;

3   obtaining a first image by imaging said displayed measurement pattern under a

4 first light intake condition using an imaging element;

5   obtaining a second image by imaging said displayed measurement pattern

6 under a second light intake condition using said imaging element;

7   obtaining a third image having a wider dynamic range than images obtained

8 through imaging with said imaging element by combining said first image and said second

9 image;

10   measuring a discrete fluophor emission intensity distribution for said

11 measurement pattern; and

12   obtaining an electron beam intensity distribution using said measured discrete

13 fluophor emission intensity distribution and said calculated data for said plurality of basic

14 patterns; and

15   outputting information relating to said determined electron beam intensity

16 distribution.

1   11.   The method for evaluating a color picture tube as described in claim

2 10, wherein in said step for displaying said measurement pattern, said measurement pattern is

3 displayed at a plurality of positions on said picture tube display surface, and a position

4 recognition pattern is displayed close to each of said measurement patterns.

1   12.   The method for evaluating a color picture tube as described in claim

2 10, wherein said second light intake condition is set so that, in said second image imaged

3 under said second light intake conditions, images associated with areas having a brightness of
4 no more than about 1% of a maximum luminance from said first image are distinguishable
5 from noise.

1   13.   The method for evaluating a color picture tube as described in claim
2 10, wherein said third image with said wide dynamic range provides noise separation in a
3 range of about 1% to about 100% of a maximum luminance of said image.

1   14.   A device for evaluating a color picture tube, comprising:
2   a display generator to display on a display surface of a color picture tube a
3 measurement pattern including a plurality of basic patterns arranged at different positions
4 relative to fluophor dots of said color picture tube and at least three auxiliary patterns near
5 said basic patterns and sufficiently large relative to said fluophor dots;
6   an imager to obtain a first image using an imaging element to image said
7 displayed measurement pattern and obtain a second image using said imaging element to
8 image while controlling light intake to allow brightness components of no more than about
9 1% of maximum luminance from said first image to be separated from noise and imaged;
10   an image processor to create a third image by combining said first image and
11 said second image while adjusting scales according to a light intake ratio;
12   a first calculating unit to calculate from said third image display created by
13 said image processor a display center positions for each of said plurality of basic patterns
14 using said auxiliary pattern positions;
15   a measuring unit to measure discrete fluophor emission intensity distributions
16 for each of said plurality of basic patterns; and
17   a second calculating unit to obtain an electron beam intensity distribution by
18 matching display center positions calculated by said first calculating unit and combining said
19 plurality of basic patterns.

1   15.   The device for evaluating color picture tubes as described in claim 14,
2 wherein in said display generator, there are at least a predetermined number of said basic
3 patterns or said line patterns or said dot patterns having phases, defined by a decimal fraction
4 of a display pitch/fluophor pitch, within a predetermined range relative to a basic pattern or a
5 line pattern or a dot pattern serving as a reference.

1   16.   The device for evaluating color picture tubes as described in claim 14,

2   wherein in said image processor, at least two of said auxiliary patterns are arranged

3   horizontally or vertically and, in a step for obtaining said third image, a slope of a line

4   connecting said at least two auxiliary patterns is calculated and rotational transformation is

5   applied to said image so that said slope is 0.

1   17.   The device for evaluating color picture tubes as described in claim 14,

2   wherein said image processor measures a pitch of said fluophors contained in said auxiliary

3   patterns in image element units, and said fluophor pitch is used to calculate an image element

4   size.

1   18.   The device for evaluating color picture tubes as described in claim 14,

2   wherein said image processor detects at least one position of said auxiliary patterns from said

3   first image and detects a corresponding auxiliary pattern position from said second image,

4   and an offset between said detected positions is used to detect an offset between said first

5   image and said second image.

1   19.   The device for evaluating color picture tubes as described in claim 14,

2   wherein said image processor displays said measurement pattern at a plurality of positions on

3   said picture tube display surface, and displays a position recognition pattern close to each of

4   said measurement patterns.

1   20.   A device for evaluating a color picture tube, comprising:

2   a displaying unit to display a measurement pattern, including a basic pattern

3   and an auxiliary pattern, on a display surface of a color picture tube;

4   an imaging unit to obtain a first image by imaging said displayed measurement

5   pattern under a first light intake condition using an imaging element and obtaining a second

6   image by imaging said displayed measurement pattern under a second light intake condition

7   using said imaging element;

8   a processing unit to create a third image by combining said first image and

9   said second image obtained from said imaging unit based on said first light intake condition

10   and said second light intake condition;

11   a first calculating unit to determine a display center position of said basic

12   pattern from said auxiliary pattern position information from said third image created by said

13   processing unit;

14   a measuring unit to measure discrete fluophor emission intensity distributions

15 for each of said plurality of basic patterns; and

16   a second calculating unit to determine an electron beam intensity distribution

17 by using display center position data calculated by said first calculating unit and combining

18 said discrete fluophor emission intensity distributions measured for each of said basic

19 patterns by said measuring unit; and

20   an outputting unit to output information relating to said determined electron

21 beam intensity distribution.

1   21. The device for evaluating a color picture tube as described in claim 20,

2 wherein said second light intake condition of said imaging unit is set so that, in said second

3 image imaged under said second light intake conditions, images associated with areas having

4 a brightness of no more than about 1% of a maximum luminance from said first image are

5 distinguishable from noise.

1   22. The device for evaluating a color picture tube as described in claim 20,

2 wherein said displaying unit displays said measurement pattern at a plurality of positions on

3 said picture tube display surface, and a position recognition pattern is displayed close to each

4 of said measurement patterns.

1   23. A device for evaluating a color picture tube, comprising:

2   means for displaying patterns displaying a measurement pattern on a display

3 surface of a color picture tube;

4   means for imaging obtaining a first image and a second image by imaging said

5 displayed measurement pattern under a first light intake condition and a second light intake

6 condition;

7   means for generating images creating a third image having a wider dynamic

8 range than images obtained through imaging with said imaging means by combining said first

9 image and said second image obtained with said imaging means;

10   means for measuring discrete fluophor emission intensity distribution

11 measuring discrete fluophor emission intensity distribution for said plurality of basic patterns;

12 and

13   means for determining an intensity distribution of an electron beam beamed to

14 said display surface of said color picture tube using discrete fluophor emission intensity

15 distribution information measured by said discrete fluophor emission intensity distribution

16 measuring means and information of said third image generated by said image generating

17 means; and

18   outputting information relating to said determined electron beam intensity

19 distribution.

1   24.   The device for evaluating a color picture tube as described in claim 23,

2   wherein said pattern displaying means displays said measurement pattern at a plurality of

3   positions on said picture tube display surface, and a position recognition pattern is displayed

4   close to each of said measurement patterns.

1   25.   The device for evaluating a color picture tube as described in claim 23,

2   wherein said second light intake condition of said imaging means is set so that, in said second

3   image imaged under said second light intake conditions, images associated with areas having

4   a brightness of no more than about 1% of a maximum luminance from said first image are

5   distinguishable from noise.

1   26.   The device for evaluating a color picture tube as described in claim 23,

2   wherein said third image generated by said image generating means provides noise separation

3   in a range of about 1% to about 100% of a maximum luminance of said image.

1   27.   A method for making color picture tubes, comprising:

2   assembling a plurality of electrodes using an electron gun assembly process;

3   using an electron gun sealing process, placing an electron gun assembled in

4   said electron gun assembly process in a bulb, forming a vacuum, and sealing said bulb;

5   assembling a deflector yoke onto said bulb and performing inspection and

6   adjustment of image quality using an image quality inspection/adjustment process, said bulb

7   assembled with said deflector yoke being sent to a next process when said image quality

8   inspection/adjustment process is passed successfully, wherein, said image quality

9   inspection/adjustment process includes:

10   displaying a measurement pattern on a screen of said bulb assembled

11 with said deflection yoke,

12   obtaining a first image by imaging said displayed measurement pattern

13 using an imaging element under a first light intake condition,

14   obtaining a second imaged by imaging said displayed measurement

15 pattern using said imaging element under a second light intake condition,

16   obtaining a third image with a wider dynamic range obtained by

17   imaging with said imaging element by combining said first image and said second image,

18   using said third image to determine an intensity distribution of an

19   electron beam beamed to said display surface of said bulb assembled with said deflection

20   yoke, and

21   approving said inspection if said determined intensity distribution is

22   within a predetermined range.

1   28.   The method for making color picture tubes of 27, wherein if an

2   irregularity is detected in quantitative evaluation of emission distribution in said image

3   quality inspection/adjustment process, information relating to said irregularity is passed on to

4   at least one of the following: said electron gun assembly process, said electron gun sealing

5   process, and said image quality inspection/adjustment process.

1   29.   The method of claim 1, wherein said first patterns are basic patterns

2   and said second patterns are auxiliary patterns.

1   30.   The method of claim 29, wherein there are at least three auxiliary

2   patterns.